TERROR BY BOMB!

A concise, up to date intelligence report on the current IRA bomb campaign throughout Great Britain. Learn the behind the scenes story of the battle between the world's most durable urban guerrilla movement and the counterinsurgency experts of the British military.

- **Improvised Explosives**
- **Delay Devices**
- **Homemade Mortars**
- **Letter Bombs**
- **Incendiaries**
- **Car Bombs**
- **Mine Warfare**
- **British Countermeasures**

Information never before available to the American public, illustrated with photos and drawings.

To receive Lancer Militaria's complete illustrated catalog of world militaria, books, uniforms, insignia, and badges, send $1 today to:

Lancer Militaria
P.O. Box 35188
Houston, TX 77035

TERRORIST EXPLOSIVES HANDBOOK

by Jack McPherson

Volume I-The Irish Republican Army

INTRODUCTION

Violence is as Irish as potatoes. Centuries of resentment and discontent have resulted in an unprecedented reign of terror in Northern Ireland. The struggle of Catholic against Protestant had lain nearly dormant for half a century before massive violence began in August of 1969. The decade of terrorism since that time has resulted in nearly 2000 deaths. A proportionate amount of violence in the United States would result in over 200,000 deaths.

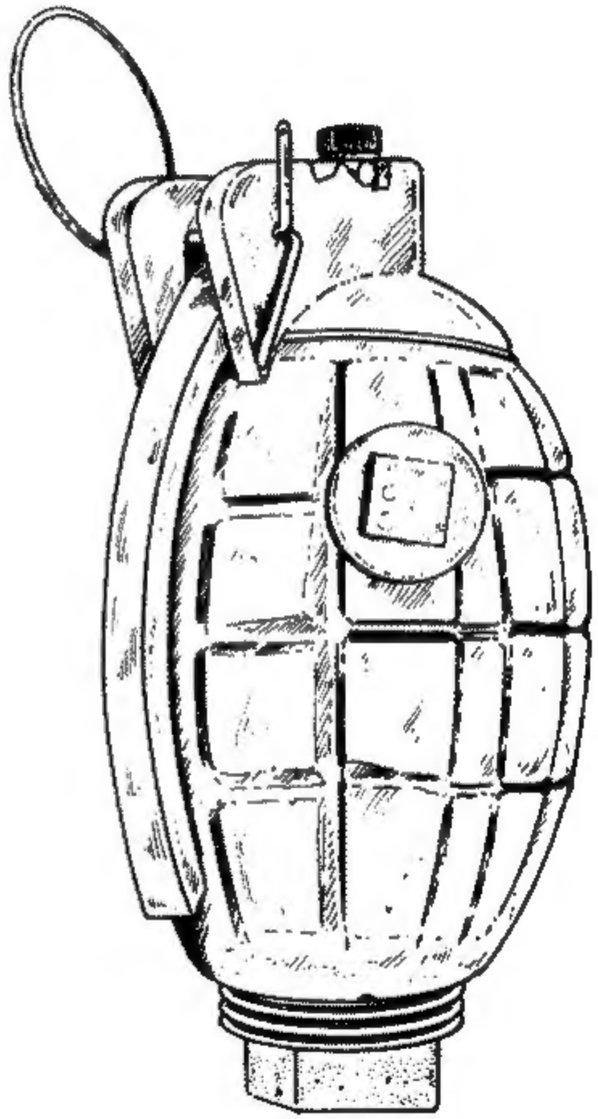
Those are the statistics of the Irish terror. It is harder to understand the conditions of hardship and fear that characterize daily life for the citizen of Northern Ireland. Sharply divided by religion and politics, Northern Ireland is practically two countries. Enemies and informers are assassinated and "kneecapped." Many areas are off limits for the British Army unless they can enter in force following extensive and careful reconnaisance. Like the Viet Cong, the terrorists are unrecognizable from the mass of the population.

Unlike the previous eruptions of the "Irish Troubles," this one has gotten worse. The actors may be no more or less committed to their cause, but the weapons of destruction available to them are vastly more powerful. The pikes and Thompson submachine guns of bygone eras are mostly a memory now. It has become the era of the bomber.

The bomb is a special terror of the 20th century. Impersonal, horribly efficient, totally merciless, bombs have blasted millions from the earth in our century. The bomb respects neither age, nor sex, nor politics. It kills in a variety of ways: blast, fragmentation, heat, shock waves. The modern bomb that a terrorist may leave in a luggage locker or in a parked car can be unimaginably destructive with pressures of up to 1000 tons per square inch and hellish temperatures.

But if bombs are fearful, the terrorist bomber is the ultimate nightmare. He may be a fanatically dedicated Marxist or a psychotic moron. He may seek only property destruction and publicity or the vengeance of a mound of mangled human scraps. He may work with his fellows to create a far flung pattern of destruction and fear or may be the loner who kills at random.

We are not concerned with politics or motivation here. This book deals with the tools of the bomber's trade. They range from the crude to the sophisticated. Most are homemade while others are supplied by governments that have a stake in the suffering and demoralization of Western nations. All share one factor in common — the genius of man for creating havoc. So many improvised weapons have been produced from household articles and common supplies that there is but one conclusion. We will not see the end of bombs until the next Stone Age.



IRA improvised grenade

INCENDIARIES

Ever since the ancients discovered Greek Fire, arson has proven to be an effective and easy means of warfare. It is also one of the most devastating as recent history proves. The Dresden and Hamburg firestorms of World War II consumed whole cities with heat sufficient to melt glass containers in bomb shelters. The firebomb attacks on Tokyo produced more destruction and loss of life than either of the later A-Bomb raids. Following the worst night of the war, 16½ square miles of Tokyo had burned to the ground with over 100,000 dead and as many injured.

Since incendiary devices are easily constructed from common materials, angry mobs employed them within hours of the start of serious disturbances in Northern Ireland. Interfactional rivalry led to mass fighting and stone throwing during an attempted Protestant march in August of 1969. By nightfall, the scene had shifted to the Catholic area of the Bogside where a fullscale battle erupted between residents and police. The police, equipped with shields and batons, were unable to remain in the Bogside due to the fierce resistance from many of the inhabitants. Operating from prepared positions, many atop commanding buildings, they pelted the police with cobblestones and the familiar Molotov cocktails. Some policement were turned into living torches by direct hits from the petrol bombs. One source estimates that 10% of the entire police force of 3,000 were injured in the opening phase of the current troubles. As police pressure was increased on the Bogside, other incidents broke out simultaneously throughout Belfast until the British Army was ordered in.

The petrol bombs were models of simplicity, consisting only of milk bottles and cloth wick. It is possible that the more sophisticated chemical ignition types of Molotov cocktail have also been used. Sometimes, however, the container is not used at all and raw gasoline is used for a raging fire. This does require a certain amount of caution. On one occasion, two arsonists entered a Protestant meeting hall and doused it with gasoline preparatory to setting it ablaze. One man climbed out a window and the man remaining inside then passed the gasoline container out and proceeded to strike a match. He was killed in the ensuing explosion.

Protestants retaliated, literally fighting fire with fire. Many Catholic families were burned out of homes in Protestant areas. Most of the liquor trade in Ulster is controlled by Catholics, and Protestant arsonists found pubs an inviting target.

Despite their ease of construction, gasoline bombs are bulky and don't make much provision for the bomber's escape. Thus, in 1970, there was the wide-spread introduction of a new and more advanced type of incendiary. Devices began appearing in crude, homemade cardboard boxes. The boxes were held together by tape and usually had a protruding wooden rod with a finger ring attached. The interior end of the rod rested between the jaws of a spring-loaded clothespin, separating electrical contacts attached to each jaw. A small wire led from each jaw to two 1.5 volt batteries connected in a series and terminated in a small heating element buried in a plastic envelope filled with sugar and chloral hydrate. Withdrawing the rod allows the circuit to close and ignites the incendiary mixture, producing a brief but intense fireball.

The obvious problem with this device was provision for a delay mechanism. This was solved simply and ingeniously. The ends of the clothespin away from the contacts were squeezed together and wrapped with soldering wire. The spring tension of the clothespin eventually caused the solder to stretch, allowing the two contacts on the jaws to touch and complete the circuit.

These devices and smaller second-generation devices concealed in such containers as cigarette packages have proven to be a dangerous and chronic nuisance for British authorities. A frequent trick is to smuggle them into stores where they will go off after closing time. Searches of customers and of the store at closing have made this more difficult.

When the bombers find one approach blocked, they will always try another. As the difficulty of smuggling and hiding fire bombs in stores increased, an old IRA trick dating from the 1930's was revived. A new variation of bomb was devised for delivery through store mail slots following closing time. These letter bomb type incendiaries were contained in a manila envelope. Inside were two plastic bags, the first containing the time-tested sugar and chloral hydrate mixture and a wax container of acid housed in a rubber balloon or condom. The second plastic bag contained gasoline to feed the fire. Prior to dropping the envelope through the slot, the acid container was crushed. The acid then began eating through the rubber until, at some uncertain time interval in the future, it would reach the sugar and chlorate mixture and ignite. Due to the absence of flammable material around the mail slot, these attacks seldom produced more than localized damage.

IMPROVISED EXPLOSIVES

Terrorist movements meet their needs for explosives in several different ways. They can steal military explosives or be issued them by a cooperative foreign power. They can steal or purchase commercial explosives. Lastly, they can manufacture their own demolition materials.

Naturally, any power attempting to control a terrorist outbreak moves to block all sources of supply. Normal customs procedures, especially combined with reliable intelligence, reduce the flow of explosives from foreign sources. Military explosives are routinely kept in secured areas, particularly when the threat of terrorist theft exists.

In Ireland, commercial explosives became an early favorite for use in the various devices examined so far. Legitimate enterprises in Northern Ireland use large quantities of commercial explosives every year, several million pounds annually. With widespread usage in industries such as mining, quarrying, and even farming, it was quite simple for the potential bomber to acquire whatever was needed for the job. As one security man put it, "Even if you're 99% successful in safeguarding a million pounds of explosives, 10,000 pounds slip through your fingers."

The Whitehall governement soon tightened up on the use of these explosives. Storage and use of commercial explosives were closely monitored. Police maintained control over blasting caps until they were used. This was partially offset by smuggling explosives from the Irish Republic, but the IRA felt the pinch.

Improvised explosives became increasingly more popular to fill the IRA's need for bombs. One of the simplest mixtures for bombs is also used in incendiaries — a blending of sodium chlorate and sugar. Whereas the incendiary is constructed in a flimsy way so as not to contain the burning process and promote a brilliant fireball, the bomber wants a different result. By confining the sugar and sodium chlorate in, say, a length of iron pipe with caps threated to both ends, the gases resulting from the fierce burning of the mixture cannot easily escape. Gas pressures in such a confined area will soon build up and rupture the casing and can be quite destructive to life and property. Ignition is usually by means of a length of safety fuse inserted through a hole drilled in one end cap. This device was also a favorite of Protestant terror groups.

Anyone who thinks such crude and simply constructed devices are probably just ineffective noisemakers is mistaken. A wooden box containing at least five pipe bombs, each with three pounds of the mixture, was left against the wall of a bar. The ensuing explosion blasted a three by four foot hole through the 18" thick wall and left the interior of the bar in ruins.

Another favorite home brew is "Co-op sugar" so named because it was first used against a store owned by the Belfast Co-operative Society. The "sugar" mixture is obtained by a 1/10 mixture of nitrobenzene and sodium chlorate, a common agricultural chemical. Nitrobenzene is used in manufacturing dyes, shoe polish, and to a small degree, in tanning. One source estimated that the yearly demand for this chemical in Ireland would probably be less than two gallons. Yet one English manufacturer filled an order for 10,000 pounds to an address in the Irish Republic. The products made from this order were used in a different kind of "dying" industry.

Here again, action produced reaction and, as of 1972, sale or possession of any fertilizer containing more than 79 percent of ammonium nitrate requires a license. This includes the sodium chlorate beloved of the IRA. Old stocks are still around in the countryside, however, and smuggling has been an honorable institution in Ireland for centuries.

British troops stand watch over the site of a recent IRA bomb blast.

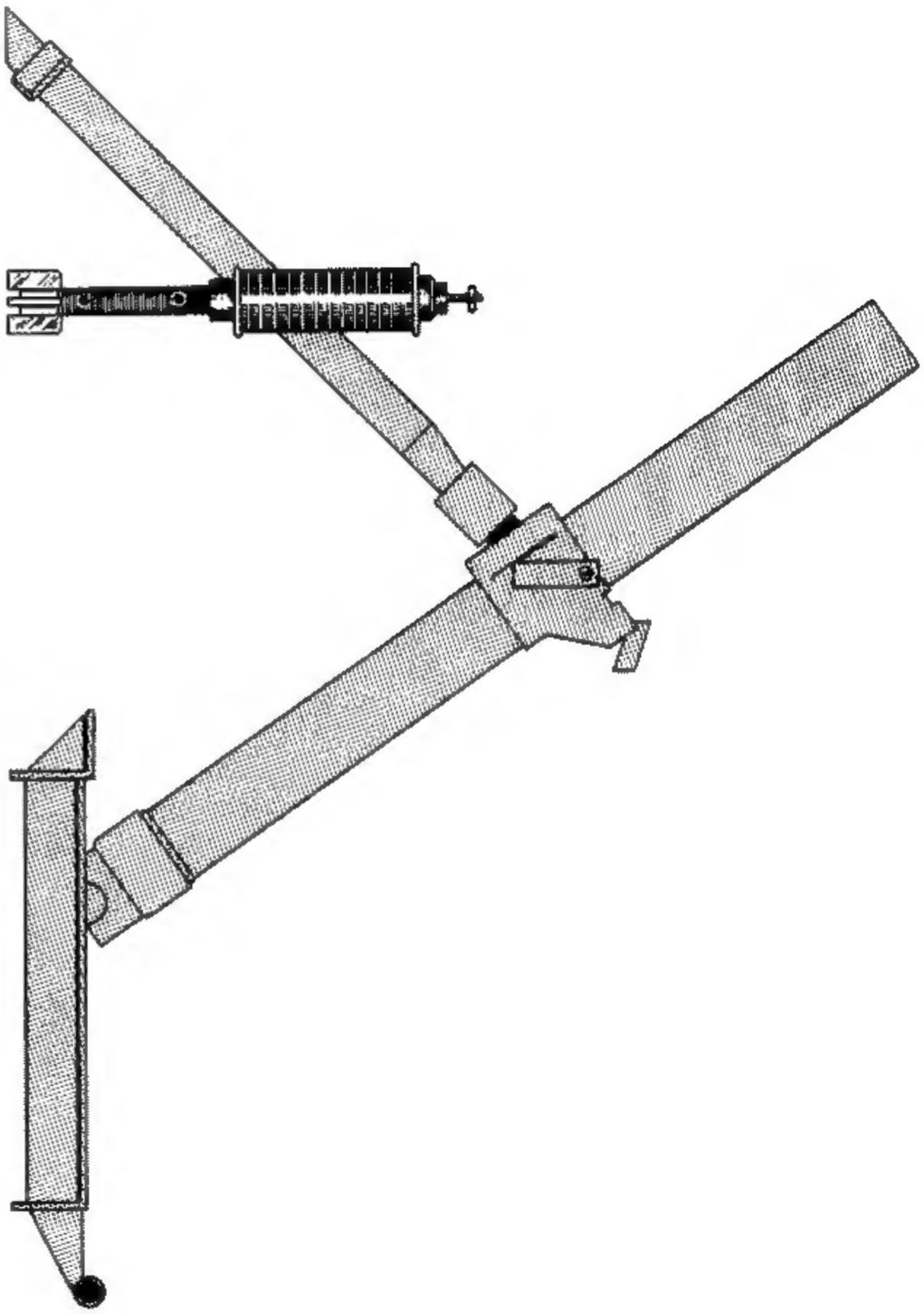
IRA IMPROVISED MORTARS

Just as every army in the world has need of artillery capable of delivering indirect fire upon an enemy, so too does the Irish Republican Army. Since IRA gunmen and bombers were frequently mauled when in close contact with British Army troops, necessity became the mother of the various Marks of IRA mortars.

The first homebuilt mortar appeared in May of 1972. It is actually more accurate to say the first mortar shall as the projectiles were more sophisticated than the primitive launch tubes. The shell was basically 16 inches of copper tubing with metal fins attached. A .303 rifle round mounted in the tail provided propulsion while the small warhead contained whatever commercial explosive was available at the moment. Detonation depended on a 90 degree impact with the target, and, as a result, many duds were the main effect of this weapon.

After returning to the drawing board, the Mark II appeared just in time for Christmas of 1972. Although the Mark II was the same 16 inch size as its predecessor, construction was of a heavier type and of steel. The .303 rifle cartridge had been replaced with a shotgun shell and the charge was one to two pounds of commercial explosive. The fuse was a .22 cartridge which, when struck, ignited two inches of saftey fuse running to a non-electric blasting cap. The weapon was a far more reliable one than the previous Mark and was capable of penetrating a building roof though not any type of substantial barrier. 26 rounds were fired in the December 1972 debut of the Mark II, resulting in some property damage, one mental patient wounded, and one Army officer killer while handling an unexploded shell.

Mark IV mortar projectile



Mark VI improvised mortar with projectile

The Mark III proved itself as the deadliest of IRA mortars, at least to its own crews. The projectile was longer than either the Mark I or II — 22 inches of heavy steel pipe, 2¼" in diameter. From the bottom of the main section protruded the 10" long perforated pipe tailpiece, 1" in diameter. The tail section was stuffed with cloth presoaked in sodium chlorate that had been given time to dry. When the round was dropped into the mortar tube, a firing pin struck a .22 cartridge in the base igniting the sodium chlorate which burned intensely and generated the gases which propelled the bomb. Leading up from the tail was 10" of safety fuse which passed through a blocking plug and terminated in a detonator in the main charge. The need for head-on impact was eliminated in this way. Moreover the launcher was concealable and accurate to about 300 yards. After over 100 shells had been fired from Mark III's at police and military facilities across Ulster, a small problem developed. A tube burst killed two IRA gunners operating their mortar from the rear of a truck. Two more mortarmen abandoned their weapon following a hangfire during an attack on a Army camp. The Mark III quickly became so unpopular that rumors spread of IRA men being "kneecapped" for refusing orders to serve the weapon.

The Mark IV, introduced in 1974, was noteworthy mostly for its new fusing mechanism. A hollow metal tube stuck out the nose end of the projectile. Inside the tube was a metal plug with a firing pin facing the warhead, this plug being secured at the top of the tube by a fairly weak shear pin. The acceleration of the projectile subsequent to firing caused the plug to break the pin retaining it and impact a primer igniting safety fuse running back to the main charge.

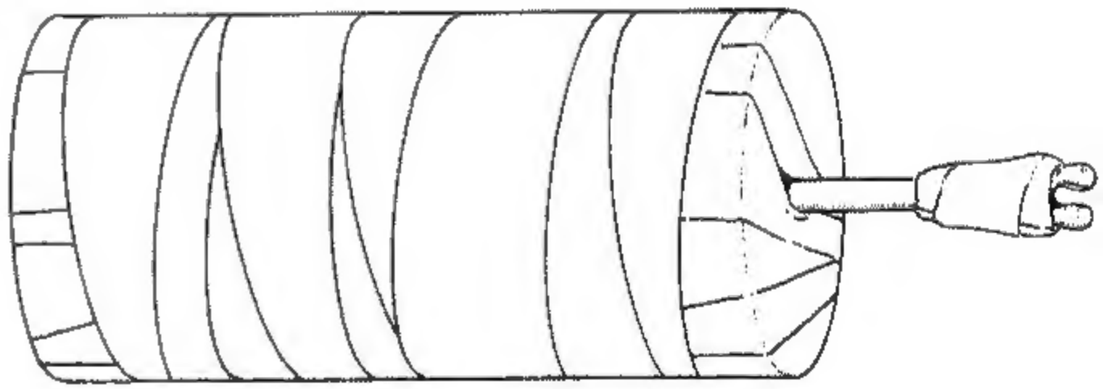
Disregarding an unsuccessful Mark V, the Mark VI is the most recent IRA mortar on which information is available. The range is about 1200 meters although the major change was again in method of detonation. The Mark VI has a small propeller on the nose which spins during the flight of the shell. The rotation of the propeller screws a firing pin into position to strike a cap on impact.

THE NAIL BOMB

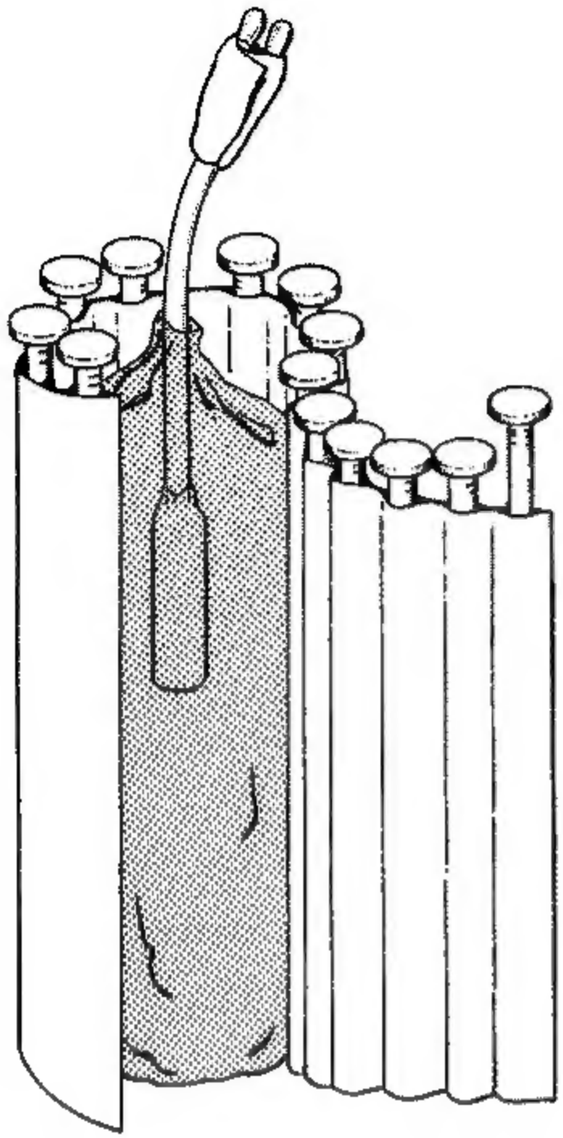
The nail bomb is a simple antipersonnel device which uses dynamite and 3" nails. Two versions have been reported. The earlier version was constructed by wrapping corrugated cardboard around two ounces of dynamite. The nails were pushed into the corrugations and the assembly was taped securely. A non-electric blasting cap was inserted in the dynamite connected to about 3" of fuse. The device was ignited with a match and thrown at troops or police.

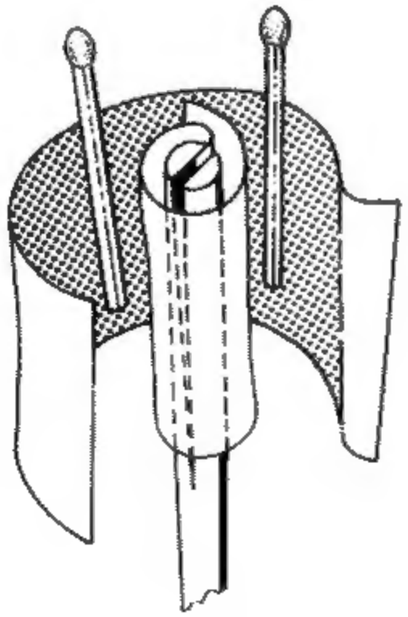
The nail bomb made its first appearance when the military was under severe restraints. As the number of these bombings increased, policies changed and the Army developed a countermeasure for these devices; anyone seen throwing a nail bomb was shot down. The sparkling fuse made the nail bomber an easy target.

Following several losses to Army marksmen, modifications appeared in the nail bomb. Matches were fastened to the fuse end of the device to provide a primitive igniter. By scraping the matches on pavement and throwing the device, the bomb fuse ignited on the way to the target, and the bomber was less obvious and had more time to escape the immediate area. The limited power and fragmentation effect of the nail bomb have relegated it to the status of a nuisance device.



IRA nail bomb — exterior view

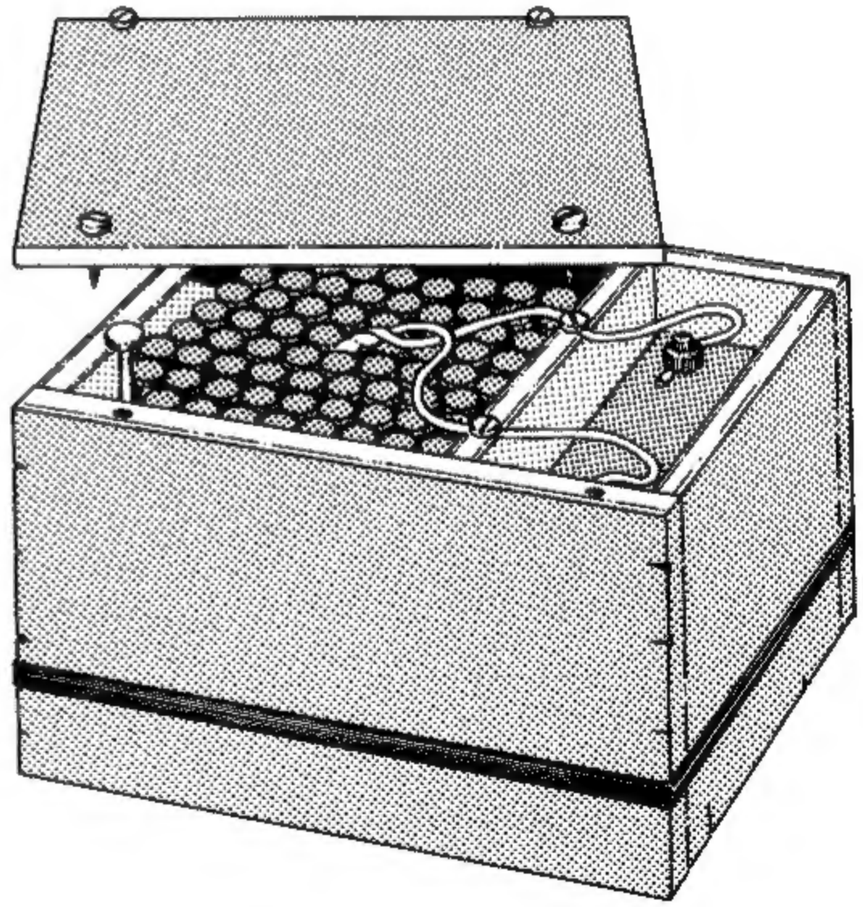




IRA nail bomb showing details of construction

THE NAIL MINE

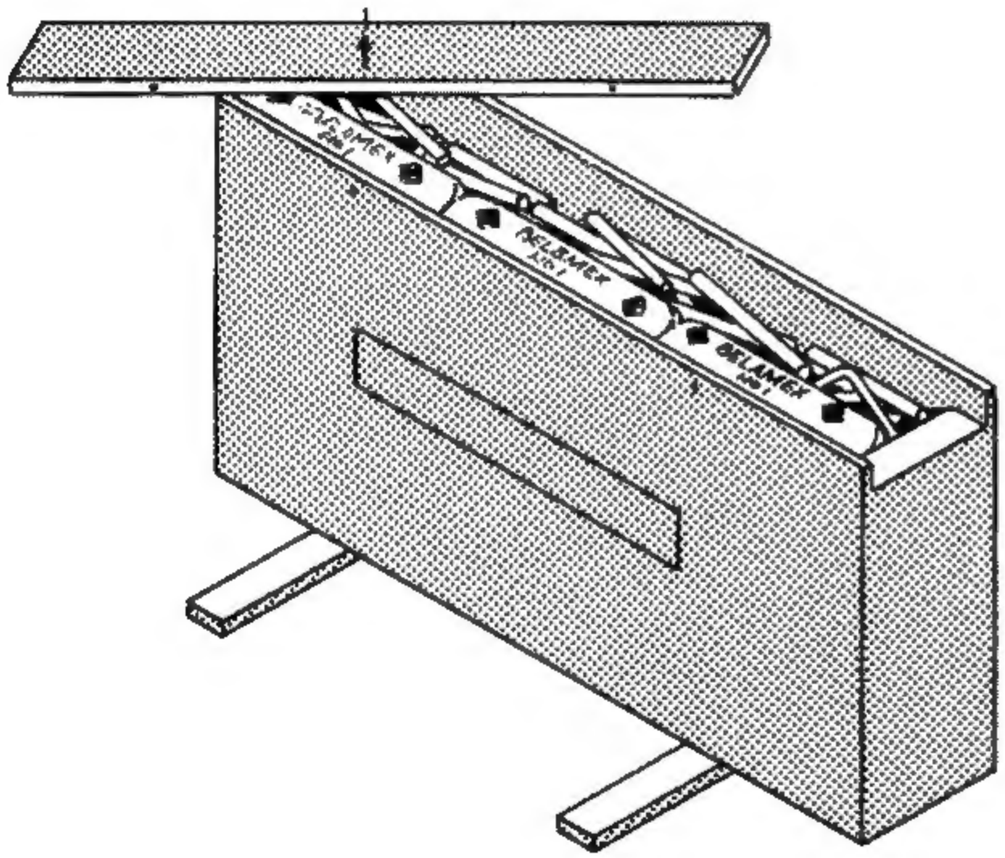
The nail mine is a booby trap type of device with features similar to several IRA bombs already mentioned. The mine consists of a wooden box divided into two compartments, one larger than the other. The larger compartment contains dynamite or other explosive material as well as the nails for shrapnel. The firing mechanism is housed in the smaller compartment. This is an electrical type system which uses a clothespin switch similar to the incendiary bomb but without the provision for a delay. The electrical contacts on the jaws of the clothespin are separated by a dowel connected to a length of stout line. Tension on the line pulls the dowel from between the clothespin jaws completing the circuit and firing the device. The nail bomb is used both as a booby trap utilizing a trip wire and as a command detonated mine.



IRA nail mine

THE CLAYMORE MINE

A homemade version of the deadly Vietnam era antipersonnel mine. The mine is constructed in a long, thin wooden box. The box is packed in two layers: one of explosives and the second of nails or lengths of steel rod. The layer of shrapnel material is faced towards the target. Proper orientation of the mine may be shown by an arrow marked on the top much as the "this side towards enemy" markings of U.S. Claymore mines. Initiation was accomplished through the usual variety of methods, including safety fuse, electrical initiation, and various types of delay devices.



IRA Claymore mine

LETTER BOMBS

Letter bombs are certainly not a problem peculiar to Northern Ireland, but the IRA has found them to be an efficient means of disrupting life among the populace. Although IRA letter bombs appeared in 1969, the first major letter bomb campaign was in 1973. On April 17, 1973, letter bombs were delivered to five police officers of the Royal Ulster Constabulary. The bombs were designed so that withdrawing the contents from the envelope pulled a pin against a detonator. These bombs were crudely constructed and none functioned.

The design was improved with the introduction of the next generation of letter bomb. Inside an envelope was a small booklet with the center cut out. Inside of this space was concealed a battery, detonator, and a small amount of explosives. Two facing pages of the booklet had foil strips connected to the battery and the rest of the firing mechanism. A piece of card was attached to the bottom of the envelope and kept the two pieces of foil separated. As the booklet was pulled from the envelope, the card remained behind allowing the pieces of foil to touch and complete the circuit, firing the bomb.

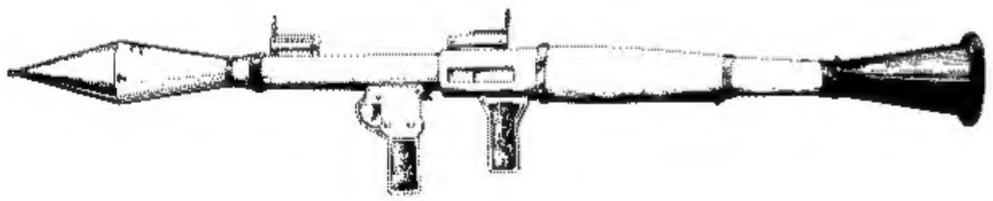
21 of these bombs were found, of which four exploded causing various injuries to a magistrate, a policeman, a postal clerk, and the mother of a prison guard. The letter bomb campaign was then expanded to addresses in London and to British diplomatic offices in the United States and Europe. Few of these devices exploded and most of the injuries received were minor. Still, the campaign was something of a success owing to the disruptive effect achieved by only a few dozen small bombs.

THE RPG7

The RPG7 is the standard individual antitank weapon of Soviet and Warsaw Pact armed forces. The HEAT type warhead is delivered by a rocket fired from a shoulder held launcher. The warhead weighs about five pounds and is of the shaped charge type design that is capable of penetrating one foot of armor plate. Range of this weapon is commonly thought to be 500 meters against stationary targets and 300 meters against moving targets, although British tests indicate it may be effective against targets up to the self-destruct range of 920 meters under ideal conditions.

This weapon has long been standard in most Communist armies worldwide but is a comparatively recent addition to the IRA arsenal. The RPG7 reached Irish hands through the courtesy of Libya's erratic dictator, Colonel Muammar Qaddafi. The first recorded Irish usage was an attack on a border police station in November of 1972. The warhead exploded on the steel shutters protecting the windows, blasted through them easily, and killed a policeman in the room behind.

Several hundred RPG's have been fired since that time with surprisingly few casualties. The capabilities of the system are apparently thwarted by the ineptitude of the operators. Nonetheless, the RPG threat is one reason for the extensive use of corrugated tin and chain link fencing around security installations.



RPG7 launcher with HEAT type rocket

CAR BOMBS

Car bombs have much to recommend them. Cars are easily gotten, are completely mobile, are so commonplace as to be practically invisible, and can hold blockbuster quantities of explosives. The larger bombs made practical by the use of an abandoned car resulted in a horrible escalation of the bombing terror. One of the earliest, and worst, car bombs exploded in Belfast's Donegall Street. A telephone call warned of a bomb in a small street off of Donegall. Many of the shoppers and workers fled the small street onto Donegall where the car bomb was actually located. When it went off, seven people were killed and 154 wounded.

Most of the car bombs are set off by electrically controlled timers. As always, there are variations. Radio transmitters have been used to detonate the bomb at the best time, i.e., when bomb disposal personnel are beginning their examination. Another bomb was wired to the interior light door switch, killing two policemen who thought they were examining just another stolen car.

Authorities soon posted no parking directives throughout cities and towns to lessen the problem. Anyone inadvertently leaving his car in one of the zones will not find his vehicle in the same condition when he returns, as security forces will treat it as a bomb carrying car. Other means of dealing with car bombs will be found in the "Counter-measures" section.

A stolen car is methodically opened with explosive charges to search for bombs. This one was a false alarm.

THE ARROW AND SPIGOT GRENADES

These devices represent two of the feebler attempts to produce a projected type of explosive weapon. The arrow grenade was exactly what the name implies — an arrow with a small can of fused explosives attached shot from a bow. This formidable system was soon replaced with the spigot grenade. The spigot used a similar homemade bomb attached to a ¾" dowel fired from a shotgun by means of a bland cartridge. Both types of grenades flew erratically and seldom exploded. They disappeared like the dinosaur, last seen in 1972.

MINES

Large areas along the border of the Irish Republic are "Indian Country" to the troops of the British Army. It is here in places like County Armagh that the IRA practices mine warfare. Operations here are less terroristic and more military. Targets are not as likely to be civilians but rather the Army, police, and members of the Ulster Defense Regiment, a reserve component of the British Army which assists in security duties.

The mines used to attack and restrict the movement of security forces are generally of improvised construction and detonated in a variety of ways. Mines may be pressure detonated or connected to trip wires. Others have been command detonated.

Size is another variable. Much as the Viet Cong occasionally used 500 — and 750 — pound bombs as land mines, some of the IRA devices have been of huge size. One command detonated mine exploded under a Saracen armored car (weight in excess of 11 tons) and threw it 20 yards. The crater from this explosion was 30 feet across and almost 20 feet deep.

The IRA does not always use mines merely to attack vehicles. Sometimes the purpose is to bait troops into a dangerous area. Working in covered and concealed areas along the sanctuary of the Irish border, IRA gunmen will use the first mine to halt movement and force troops to deploy in a defensive formation. If the troops attempted to search the area, they might run into large and elaborately booby trapped fields bedecked with pressure, command, and trip wire detonated explosives.

Such tactics have resulted in more wide-spread use of helicopters for patrol work and for reaction forces. Army troops do not normally enter an area where a mine has exploded except in daylight and only then following extensive aerial reconnaissance. Insertion of specially trained explosives search teams and bomb sniffing dogs reduces risk still further.

DELAY DEVICES

In the classic war movie, "The Guns of Navarone," David Niven played a British explosives expert named Miller. When Miller discovers that his elaborate timers have been sabotaged by a traitor, the team leader, played by Gregory Peck, inquires if he will still be able to blow the guns. Miller replies glumly that it is always possible to make explosives go off, the trick being to be someplace else when it happens.

The IRA doesn t believe in surcide bombings nor does it have access to factory type delay devices unless the opportunity arises to steal them or smuggle them in from a cooperative foreign power. As with much else, they simply have to improvise and work with the commonplace materials available.

Possibly the crudest delay mechanism was that used with the primitive cardboard box incendiaries. The bomber could adjust the amount of tension in the solder wire which kept the clothespin open and the electrical contacts apart, thus having at least some control over the timing of ignition. A number of these incendiaries were recovered before ignition with delay estimates pencilled onto the clothespins!

The easiest and most familiar improvised delay devices are modified clocks, watches, and other simple timers. The IRA introduced a series of time bombs in 1971 using the small pocket timers which allow a motorist to keep track of unexpired time on a parking meter. The timer had the bell clapper removed and replaced with two contacts which could close at any selected interval of up to two hours. They were generally housed in homemade wooden boxes.

Several of these devices were recovered intact when faulty construction resulted in a failure of the contacts to close, leaving an unexploded bomb. While this is theoretically one of the easiest bombs for an ordnance disposal man to defuse, it can also be quite dangerous. The contacts are under spring tension and moving the timer even slightly can restart a stalled mechanism, possibly with only a few seconds remaining before detonation.

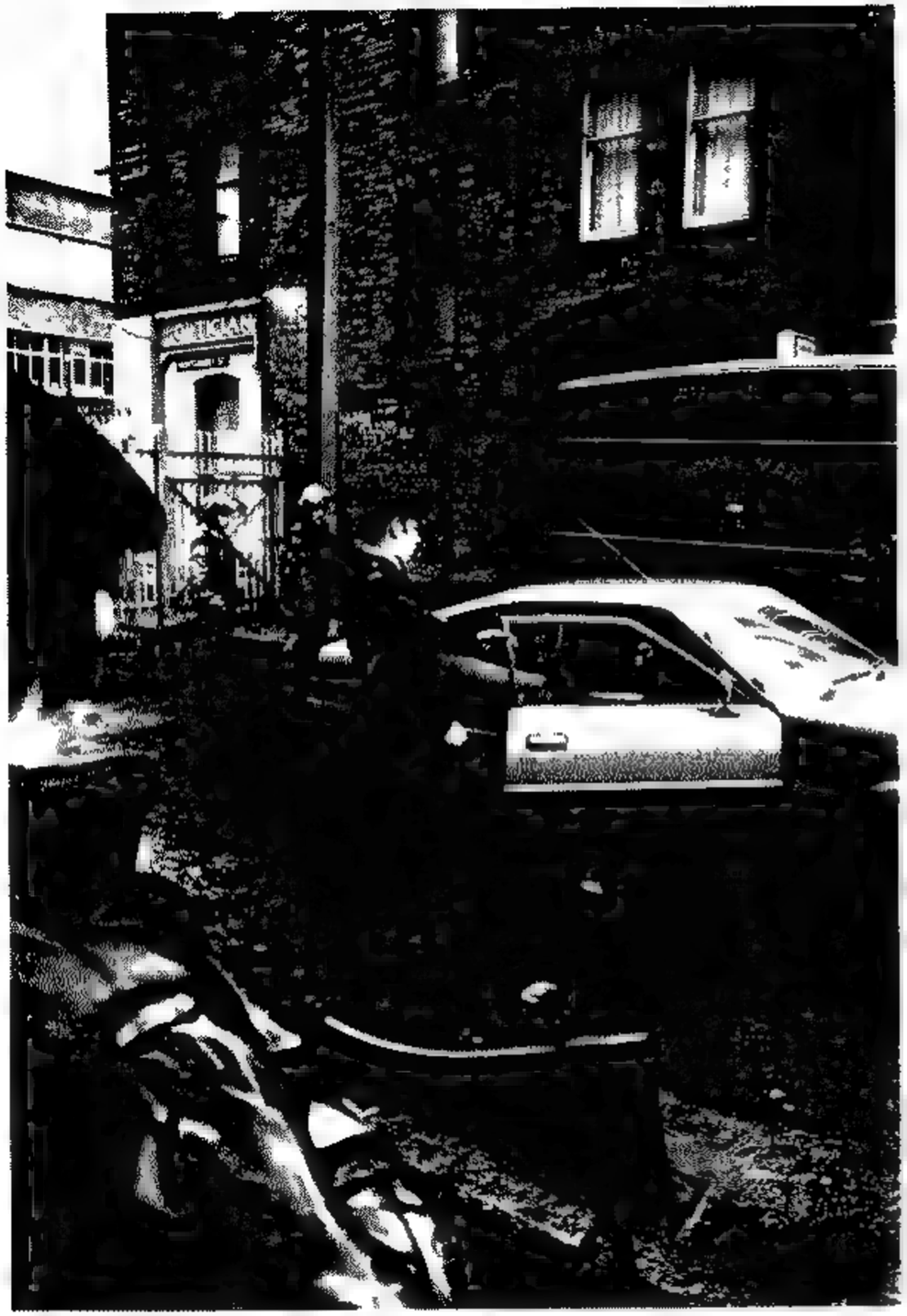
Most of the subsequent changes in these timers have been to add various anti-handling devices to them. The first modification to the basic timer was a special fuse switch to the primary electrical circuit. After the bomber set the delay and heard the ticking of the timer, he flipped a toggle switch on the wood box which allowed the batteries to connect into the primary firing circuit and blow the fuse switch rendering the toggle switch inoperable as far as stopping the bomb

Anti-lift mechanisms that turned the bombs into more sophisticated booby traps appeared later in 1971. Following the death of a bomb disposal man, it was found that two microswitches had been added to the basic bomb design. These were connected to a secondary circuit that detonated the charge if the lid were lifted or the device tilted The British Army learned the secrets of this device in short order, necessitating another escalation of the duel

A new device appeared with the same anti-handling properties as the old but with a new sort of timer. Known as a collapsing circuit, the timer used a relay coil with points connected independently to the firing wires. The points of the relay were kept apart as long as the battery supplied electricity. As the battery wore down, the points drew closer together until contact was made and firing initiated. All of this meant that the bomb would fire after an unpredictable length of time — vastly increasing the problems of disposal personnel.

As the various mechanisms and circuitry have become more sophisticated, it has become a common precaution to x-ray devices before handling whenever possible, so the expert need not work totally blind. Predictably, the IRA countered, and many subsequent x-rays have shown a jumbled picture not unlike a bowl of spaghetti, as the designers added extraneous and decoy circuits and mechanisms to confuse the issue.

When one considers the possible variations in timers and booby trap switches, the job of disarming them becomes formidable indeed. It is a high tribute to the men of the Royal Army Ordnance Corps that there have been very few devices that they could not quickly learn to render harmless



Civilian Search Unit (CSU) with military protection

COUNTERMEASURES

If you step into any car of the London subway and look around you, it won't be long before you see a red, white and black sign between the ads for temporary jobs and holidays in Spain The sign warns the passenger to beware of unattended packages and outlines prodecures to be followed in the event one is found. The traveller at London's Heathrow Airport may occasionally see armored vehicles and Army troops deployed around the field Luggage lockers in public places have been removed and checking facilities either curtailed or carefully monitored Even the police are carrying firearms with greater frequency than in the recent past. There are those in this country who, pushing one or another political goal, declare England to be free of violence. It is still safer to walk the streets of London than New York, but the fact remains that violent incidents are now a daily occurrence in Britain, and the public has had to change its attitudes accordingly.

Hardest hit, of course, are the people of Northern Ireland. Most of them are sick of the violence and the grief and hardships it brings Central business districts are walled off with Civilian Search Unit (CSU) personnel, backed by the military, checking shoppers as they enter. No parking is allowed in these central districts, and the shopper may be searched again upon entry to a particular store

The military has a still greater problem in presenting a hardened target to the terrorist. Troops are moved out of Northern Ireland after a few months duty so routine will not dull the need to remain constantly alert amidst boring surroundings and duties. The familiar chain link fence remedy to the RPG threat is in widespread usage Likewise the use of corrugated iron around military compounds to protect from both fire and observation. The armored troop carriers ("pigs" to friend and foe alike) have received heavier armor protection

As might be expected in a country that licenses everything from shotguns to television sets, strict controls have long been in effect on explosives. Controls were even extended to chemicals such as ammonium nitrate fertilizers. Terrorists of all religious persuasions soon found substitutes, making the controls predictably futile Explosives control was doomed from the start in a country that has lawful uses for several million pounds of commercial explosives per year A vast number of terror devices can be constructed from a minute fraction of that amount

A mechanical bomb sniffer in action

One promising possibility is bomber control rather than bomb material control. Surprisingly enough, many if not most of the IRA bombers and terror teams are known to the military and the police This enables the authorities to monitor their activities but not to incarcerate them since the internment of gunmen and bombers is objectionable to some London politicians. Such restraint is necessary in a free country though totally unrealistic when that country finds itself a war zone. Free societies often suspend or abridge civil liberties during specified periods of emergency in order that freedom may be fully restored by eliminating the original threat to the nation. Unless the terrorist is observed in a crime or otherwise "caught dirty" he has almost a free ride

Less depressing are a number of James Bondian mechanical countermeasures in daily use in Ireland. Two of the most interesting are the bomb "sniffer" and the "Wheelbarrow" robot bomb handler.

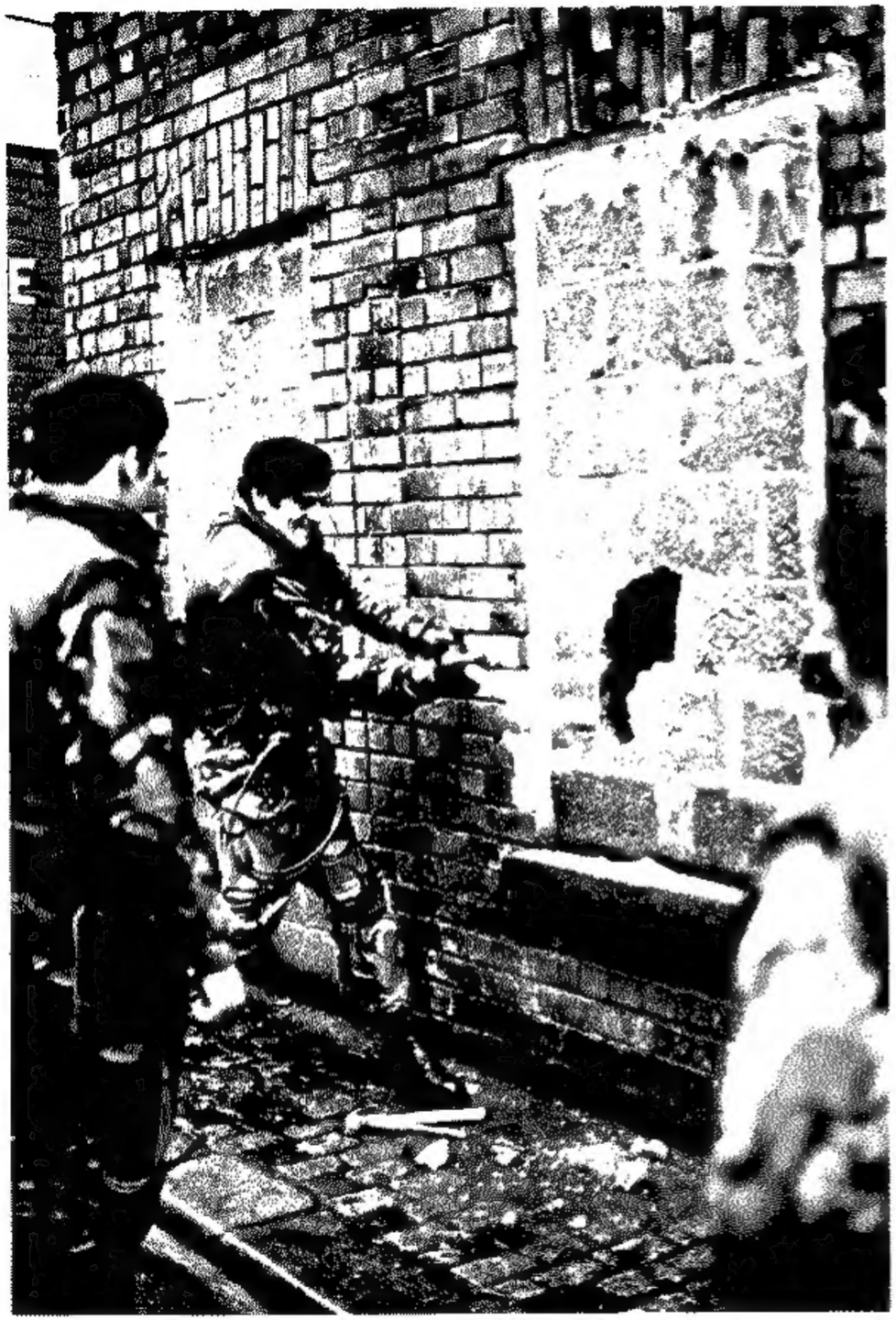
Dogs are in daily use in Ireland to sniff out explosives. Man's best friend now has competition, however, in the form of a mechanical device that resembles a cross between a backpack and a metal detector. The device can analyze and warn of the presence of typical vapors given off by explosives and never requires a bath or a Milkbone

Easily the most fascinating of British countermeasures to the bomb threat is "Wheelbarrow." Wheelbarrow is a robot device that makes you believe the British really do have clandestine factories churning out the exotic gimmicks that are a staple of all the James Bond films.

One can easily imagine the dialogue between the perpetually harassed equipment man, Q, and James Bond. "Right, 007, now I want you to pay particular attention to this Meet Wheelbarrow, a completely self-contained, 100% mobile mechanical bomb disposal man. Now if you find yourself in a situation where there may be a bomb about, Wheelbarrow can look for it, handle it, and even disarm it."

Wheelbarrow is no cinematic fantasy but an invaluable disposal tool in daily use in Northern Ireland. Although the device is now track driven, the first prototype appeared in 1971 and had three wheels, hence the Wheelbarrow name which stuck with the many Marks developed since that time. The latest model is the Mark 7, and the information given will only concern this latest development

The tracks are driven by two electric motors and powered by two lead acid batteries carried on board the vehicle The operator maintains exact control of the vehicle and its several accessories through a hand-held control box connected to the Wheelbarrow by a heavy



British troops prepare to enter an abandoned building — a favorite hiding place for IRA arms

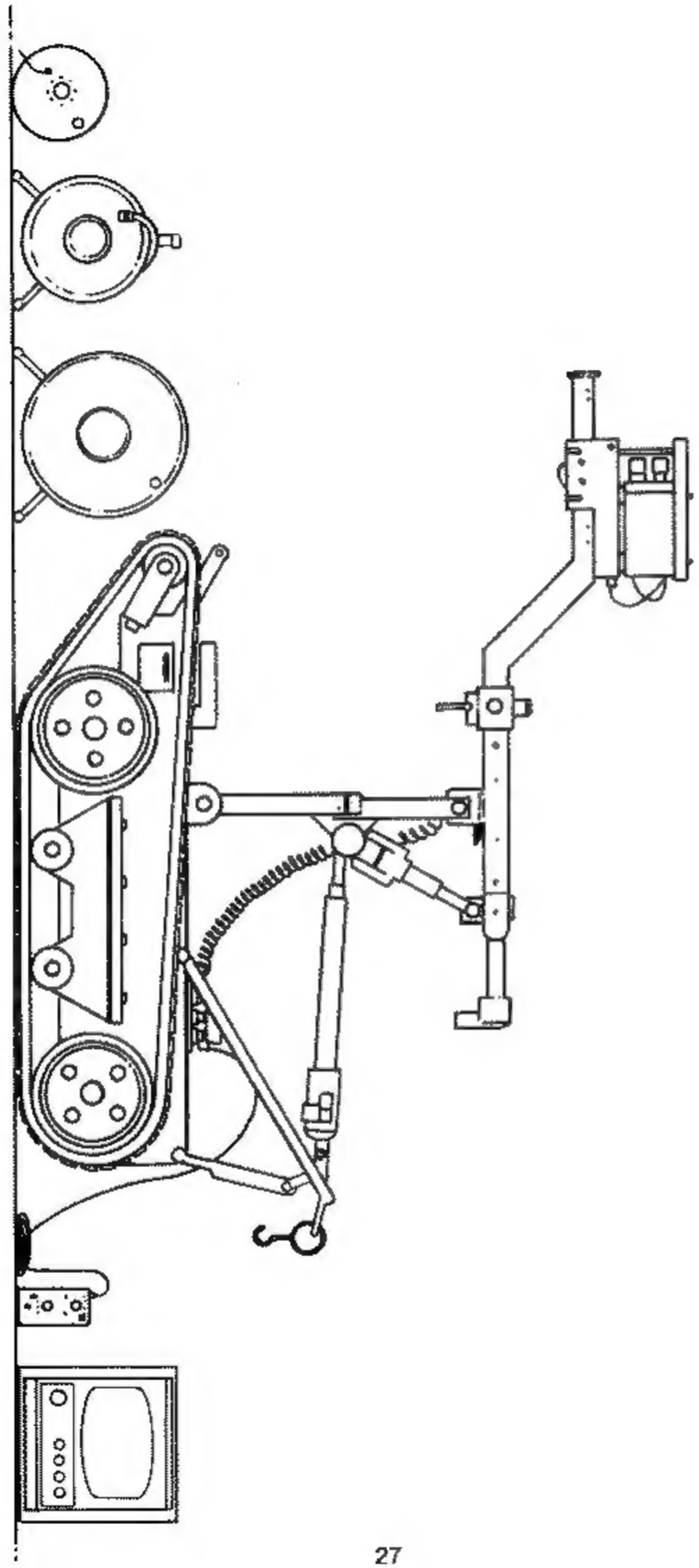
cable. The vehicle and accessories are usually stored in a Land Rover or similar transport ready to respond to any potential bomb emergency.

When the call goes out, the Wheelbarrow is offloaded at the scene while the operator takes up a protected position out of harm's way. He may then direct the Wheelbarrow to the potential bomb using either direct sight or the closed circuit camera on board the vehicle connected directly to the monitor at his position. The camera is mounted on a fully articulated boom which may be moved in all directions to allow a careful examination of the situation from all angles. It is often necessary to break the windows of suspected car bombs to permit close examination for which purpose Wheelbarrow can use either a special window breaking attachment or its automatic shotgun. The shotgun may also be fired into suspicious objects to either detonate them or help prove them harmless.

As controlled explosive charges are often used to open the doors or trunk of a car, the machine is capable of placing these in position and then withdrawing, trailing a firing cable behind. If ordnance personnel wish to attempt to tow the car to a safer location, Wheelbarrow will attach the tow cable.

Wheelbarrow is also equipped with accessories to handle bulky objects such as heavy milk cans, which are a favored hiding place for IRA bombs.

One of its most useful aspects is building reconnaissance. Naturally, entering a potentially mined building is a nerve-wracking job and one in which a machine is more likely to go about its duties unperturbed. The tracks on Wheelbarrow enable it to climb stairs and make it fully mobile within buildings. The builders have even equipped this robot bomb handler with an accessory to approximate a human survival instinct. Wheelbarrow is equipped with a nail gun on either side which can fire down into the floor and prevent an open door from being closed behind it, blocking its exit from a building.



Wheelbarrow robot bomb handler with accessories

SA-7 Missile

A British military intelligence report issued in 1979 warns of a potentially disastrous new dimension in IRA terrorism. The IRA, the report states, may soon possess the dreaded Soviet SA-7 shoulder fired anti-aircraft guided missile. A copy of this classified report fell into the hands of the Provisional wing of the IRA who leaked it to the British press. The British Defense Ministry has confirmed the authenticity of the report which was released in the United States by the Agence France-Presse.

The SA-7 is similar in appearance and design to, if less sophisticated than, the American Redeye missile system. The launcher is about 4'5" in length and, with its rocket, weighs in excess of 43 pounds. The effective horizontal range of the system is slightly more than two miles and it is capable of reaching targets over one mile in altitude. Operation is also similar to the Redeye with a two stage launching sequence. The operator first switches on a thermal battery powering the infrared tracking mechanism. The launcher is then aimed at the target and the operator receives an audible tone when the IR signal has become strong enough for the missile to track. Having received the tone and assuming the target is within the launching range of the weapon, the operator presses a trigger which ignites a booster motor, hurling the SA-7 from its launcher. When the rocket has travelled a safe distance from the launcher, the sustainer motor cuts in to provide power for the remainder of the flight. The high explosive warhead functions by either direct impact or grazing action with the target aircraft.

The SA-7 has seen widespread service with Arab and Warsaw Pact countries as well as combat usage in Vietnam and the 1973 Yom Kippur War. It is probable that the IRA might make operational use of the system against British military aircraft, particularly in the contested border areas near the Irish Republic. Its main value, however, would be as a super terror weapon directed against British civil aviation.

Terrorists operating from Zambia have used the SA-7 with deadly effect against Rhodesian commercial airliners and it would be highly naive to imagine that the IRA is not closely following their success. A commercial jet with multiple engines provides a massive IR signature and is a sitting duck at takeoff and landing, the phases when IRA gunners would almost certainly be stalking them. Agressive intelligence operations are the only good defence against the SA-7; when the operator has his missile in readiness a mile from the end of the Heathrow runway it will be too late.

THE FUTURE

An AP wire service article appeared near the end of 1978 and reviewed the situation in Ulster. While British authorities still have intensive security measures in force, they reported some reasons for optimism. Killings decreased in 1978 as did the number of bombings. Troop strength was reduced to 13,500 and the Army maintained a new low profile with local police authorities taking on more of the security duties. Major towns are no longer sealed off and most of the permanent Army checkpoints have been taken down.

Nobody is counting the IRA out yet. The end of 1978 brought new waves of car and letter bombings. Despite being pared down to a strength of only about 500 hard-core activists, the Provisional IRA is still well-armed and dedicated. If the number of bombings declined in 1978. there is still no great cause for joy as the IRA had by August of 1978 used "well in excess" of the 8,000 pounds of explosives used throughout all of 1977.

Political turmoil in Ireland has caused violence for centuries and will continue to do so for the foreseeable future. One "Provo" veteran summed it up in a secret interview with an AP reporter: "We're not beaten. We've suffered some reverses. But we've survived everything the British Army has tried on us and as long as one British soldier remains on Irish soil there'll be somebody there to shoot him."

An officer of the British Parachute Regiment briefs a patrol before their departure

British officers stand by in a tactical operations center.